Computer Networks: Understanding Network Devices

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- To access the updated handouts, please click on the following link: https://yasirbhutta.github.io/cs-407-computer-networks/docs/lab2.html
- **Lab 2:** Understanding Network Devices
    - Introduction to routers, switches, hubs, and modems.
    - Hands-on activity: Configure basic settings on a router and switch using network simulation tools.

Hands-On Activity: Configure Basic Settings on a Router and Switch Using Cisco Packet Tracer

In this hands-on activity, we'll configure basic settings on a router and a switch, including hostname, passwords, IP addresses, and enable remote management (SSH or Telnet) for network administration.

Topology

- 1 **Router** (e.g., Cisco 1941)
- 1 **Switch** (e.g., Cisco 2960)
- 1 **PC** (to manage the devices via SSH or Telnet)

Step-by-Step Instructions

1. Set Up the Topology in Cisco Packet Tracer

- Open **Cisco Packet Tracer**.
- Drag the following devices onto the workspace:
    - 1 **Router** (e.g., 1941 Router)
    - 1 **Switch** (e.g., 2960 Switch)
    - 1 **PC**
- **Connect the devices**:
    - Use **Copper Straight-Through** cables to connect:
        - **Router's GigabitEthernet0/0** to **Switch's FastEthernet0/1**
        - **PC** to **Switch's FastEthernet0/2**

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2. Configure Basic Settings on the Router

1. **Access the Router CLI**:

- Click on the **Router**.
- Select the **CLI** tab.

2. **Enter Configuration Mode**:

```
Router> enable
Router# configure terminal
```

3. **Set the Hostname**:

```
Router(config)# hostname R1
```

4. **Set Console Password**:

```
R1(config)# line console 0
R1(config-line)# password cisco
R1(config-line)# login
R1(config-line)# exit
```

5. **Set VTY Password (for Telnet/SSH)**:

```
R1(config)# line vty 0 4
R1(config-line)# password cisco
R1(config-line)# login
R1(config-line)# exit
```

6. **Set Enable Password (Privileged EXEC Mode)**:

```
R1(config)# enable secret cisco
```

7. **Configure an IP Address on GigabitEthernet0/0**:

```
R1(config)# interface gigabitEthernet 0/0
R1(config-if)# ip address 192.168.1.1 255.255.255.0
R1(config-if)# no shutdown
```

8. **Save the Configuration**:

```
R1(config-if)# end
R1# write memory
```

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3. Configure Basic Settings on the Switch

1. **Access the Switch CLI**:
   - Click on the **Switch**.
   - Select the **CLI** tab.
2. **Enter Configuration Mode**:

```
Switch> enable
Switch# configure terminal
```

3. **Set the Hostname**:

```
Switch(config)# hostname S1
```

4. **Set Console Password**:

```
S1(config)# line console 0
S1(config-line)# password cisco
S1(config-line)# login
S1(config-line)# exit
```

5. **Set VTY Password (for Telnet/SSH)**:

```
S1(config)# line vty 0 4
S1(config-line)# password cisco
S1(config-line)# login
S1(config-line)# exit
```

6. **Set Enable Password (Privileged EXEC Mode)**:

```
S1(config)# enable secret cisco
```

7. **Configure an IP Address for Switch Management** (on VLAN 1):

```
S1(config)# interface vlan 1
S1(config-if)# ip address 192.168.1.2 255.255.255.0
S1(config-if)# no shutdown
```

8. **Save the Configuration**:

```
S1(config-if)# end
S1# write memory
```

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4. Configure PC Settings

1. **Configure PC's IP Address**:
   - Click on the **PC**.
   - Go to the **Desktop** tab and select **IP Configuration**.
   - Set the following:
     - IP Address: `192.168.1.3`
     - Subnet Mask: `255.255.255.0`
     - Default Gateway: `192.168.1.1` (the router's IP)

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5. Test Connectivity

1. **Ping the Router and Switch from the PC**:
   - Open the **Command Prompt** on the **PC**.
   - Test connectivity with the router:

```
ping 192.168.1.1
```

   - Test connectivity with the switch:

```
ping 192.168.1.2
```

2. **Establish a Telnet or SSH Connection** (Optional):
   - In the PC's **Command Prompt**, you can establish a Telnet connection to the router or switch.
   - Example (for Telnet):

```
telnet 192.168.1.1
```

Summary of Configuration

- Router and Switch have been configured with basic settings such as hostname, console password, enable password, and VTY password.

- An IP address has been configured for both the router and switch for remote management.
- The PC can successfully communicate with both devices using **ping**, and you can optionally enable **Telnet** or **SSH** for remote access.

This completes the basic setup of a router and switch in Cisco Packet Tracer.